Patent claims

1. Ceramic material composed of

- a first ceramic material with a perovskite structure as the host lattice, containing lead, zirconium and titanium and

- a second ceramic material with a cryolite structure.

2. Ceramic material per claim 1,

in which the first and the second material form a mixed crystal phase.

3. Ceramic material per one of claims 1 or 2,

in which the second ceramic material has the general formula $[A_4(Br_{2-2x/3}Nb_{2+2x/3})O_{11+x}V_{1-x}]$, where A stands for barium or strontium and B for strontium or calcium and V for an oxygen vacancy and where we have for the parameter x: $0 \leq x \leq 1$.

4. Ceramic material per one of claims 1 or 2,

in which the second ceramic material has the summary formula $[Sr_4(Sr_{2-2x/3}Nb_{2+2x/3})O_{11+x}V_{1-x}]$, where V stands for an oxygen vacancy and where we have for the parameter x: $0 \leq x \leq 1$.

5. Ceramic material per one of claims 1 or 2,

in which the second ceramic material has the summary formula $Sr_4(Ca_{2-2x/3}Nb_{2+2x/3})O_{11+x}V_{1-x}$, where V stands for an oxygen vacancy and where we have for the parameter x: $0 \leq x \leq 1$.

6. Ceramic material per one of claims 1 or 2,

in which the second ceramic material has the summary formula $Sr_4(Mg_{2-2x/3}Nb_{2+2x/3})O_{11+x}V_{1-x}$, where V stands for an oxygen vacancy and where we have for the parameter x: $0 \leq x \leq 1$.

7. Ceramic material per one of claims 1 or 2,

in which the second ceramic material has the summary formula $Ba_4(Sr_{2-2x/3}Nb_{2+2x/3})O_{11+x}V_{1-x}$, where V stands for an oxygen vacancy and where we have for the parameter x: $0 \leq x \leq 1$.

8. Ceramic material per one of claims 1 or 2,

in which the second ceramic material has the summary formula $Ba_4(Ca_{2-2x/3}Nb_{2+2x/3})O_{11+x}V_{1-x}$, where V stands for an oxygen vacancy and where we have for the parameter x: $0 \leq x \leq 1$.

9. Ceramic material per one of claims 1 or 2,

in which the second ceramic material has the summary formula

$Ba_4(Mg_{2-2x/3}Nb_{2+2x/3})O_{11+x}V_{1-x}$, where V stands for an oxygen vacancy and where we have for the parameter x: $0 \leq x \leq 1$.

10. Ceramic material per one of claims 1 to 9,

in which the first ceramic material contains a composition of summary formula $Pb(Zr_aTi_{1-a})O_3$, and where we have for a: $0.5 \leq x \leq 0.6$.

11. Ceramic material per one of claims 1 to 10,

in which the first ceramic material consists of a mixed crystal phase, which is composed from a PZT ceramic and an added component of the perovskite lattice type.

12. Ceramic material per claim 11,

in which the added component has the summary formula $KNbO_3$.

13. Ceramic material per claim 11,

in which the added component has the summary formula $Pb(M^{II}_{1/3}\ M^{V}_{2/3})O_3$ and wherein M^{II} stands for Mg, Zn, Co, Ni, Mn, or Cu and M^{V} for Nb, Ta, or Sb.

14. Ceramic material per claim 11,

in which the added component has the summary formula $Pb(M^{II}_{1/2}\ M^{VI}_{1/2})O_3$ and wherein M^{II} stands for Mg, Zn, Co, Ni, Mn, or Cu and M^{VI} for W.

15. Ceramic material per claim 11,

in which the added component has the summary formula $Pb(M^{III}_{1/2}\ M^{V}_{1/2})O_3$ and wherein M^{III} stands for Fe, Mn, Cr, or Ga and M^{V} for Nb, Ta, or Sb.

16. Ceramic material per claim 11,

in which the added component has the summary formula $Pb(M^{III}_{2/3}M^{VI}_{1/3})O_3$ and wherein M^{III} stands for Fe, Mn, Cr, or Ga and M^{VI} for W).

17. Ceramic material per claim 11,

in which the added component has the summary formula $Pb(Li^{I}_{1/4}M^{V}_{3/4})O_3$ and wherein M^{V} stands for Nb, Ta, or Sb.

18. Ceramic material per claim 1 to 17,

in which the ceramic material has the summary formula $A_{1-b-c}B_bC_c$, where: $0 \leq b \leq 0.5$ and $0 \leq c \leq 0.01$ and wherein

- A stands for the composition $Pb(Zr_aTi_{1-a})O_3$ and $0.5 \leq a \leq 0.6$,
- B stands for an added component of the perovskite lattice type, and
- C stands for a ceramic material of cryolite lattice type.

19. Ceramic material per claim 18,

which additionally contains also a PbO excess of up to 3 mol. %.

20. Ceramic material per one of claims 1 to 19,

which is free of $KNbO_3$.

21. Piezo-actuator

- having a monolithic stack of superimposed piezoelectrical ceramic layers (2) and electrode layers (3) lying in between, wherein at least one ceramic layer (2) contains a ceramic material according to one of claims 1 to 19.

22. Method for production of a ceramic material per one of claims 1 to 20,

wherein precursor materials of a ceramic material with a cryolite structure are mixed with precursor materials of a PZT ceramic.

23. Method for production of a ceramic material per one of claims 1 to 20,

wherein a previously prepared cryolite phase is mixed with precursor materials of a PZT ceramic.